1.0 INTRODUCTION

1.1 SCOPE

Oak Ridge National Laboratory (ORNL) was tasked by the U.S. Army Engineering and Support Center, Huntsville (USAESCH) to conduct digital photographic interpretation of historical photographs of sixteen chemical training areas with the Fort McClellan Army Installation, Alabama. The sixteen areas of concern are shown in Fig. 1.

The Introduction Section of the report discusses the methods used by ORNL in completing the digital photographic interpretation. Sections 2–17 include the results of each chemical training area studied, and Section 18 includes the references used during this project. Tabs are included for each section to assist the reader in identifying information for each chemical training area. The figures for each area of concern (AOC) are labeled separately by section (i.e., each section contains figures one through four labeled with the AOC name specific to that section).

1.2 METHODS USED

Historical aerial photographs were analyzed to detect possible contamination-related activities using two different methods: a date-by-date analysis and a temporal analysis of landscape trends. The collection and analysis of historical aerial photographs were conducted in the following steps:

1. Good quality copies of aerial photographs provided by the USAESCH were reviewed and selected based on completeness of coverage, quality, scale, and date.

2. A modified version of the U.S. Geological Survey (USGS) land use/cover classification system was developed to classify land use/cover (see Table 1 for the Fort McClellan classification system) (Anderson et al., 1976).

3. Selected aerial photographs were scanned at 600 dots per inch (dpi) and converted to Erdas Imagine (.img) format. Second- or third-order transformations were applied to rectify the photographs to the available 1994 Roads coverage which was provided by IT Corporation.

4. Land use/cover features were digitized and attributed for each successive year of historical aerial photographs.

5. Anomalies were computed from the digital databases by analyzing the changes in land use/cover over time relative to the expected land use/cover progression. In order to determine specific temporal differences in land use/cover, changes were computed on a year-by-year basis.

6. The anomalies for each year of change were inspected to ascertain the cause of each anomaly. Anomalies for which the cause could not be discerned, as well as anomalies that might be related to waste disposal or chemical training activities, were determined to be of potential concern. The anomalies of potential concern were then combined in an Anomalies of Concern map to facilitate identification by the USAESCH.

All roads, buildings, and landscaping activities are considered human disturbance to land cover and were identified as anomalies in the year-by-year analysis. Paved roads are not normally primary

indicators of undocumented waste activities; unpaved trails which appear for only a brief period of time are more likely to have been associated with waste disposal or training activities. In addition, the clearing or partial clearing of vegetation (without an obvious reason such as the construction of a building or road) could also indicate an area that was previously used as a waste disposal or training site. Major paved roads have not been identified as anomalies of potential concern; however, unpaved roads and areas in which trees or groundcover have been cleared are designated as anomalies of potential concern. A discussion of anomalies identified during the year-by-year comparison follows.

Fig 1

Table 1. Fort McClellan Aerial Photographic Interpretation Land Use/Cover Classification System

Level I	Level II	Level III
Developed Land	(Db) Cleared land	
	(Dc) Commercial	
	(De) Excavation	
	(Di) Industrial	(Dia) Airport (including runways, towers, buildings, etc)
		(Dib) Building
		(Dih) Hazardous Waste Operations
	(Dn) Institutional	(Dna) Ammunition Range
		(Dnc) Cemetery
		(Dnj) Correctional
		(Dne) Educational
		(Dng) Governmental Building
		(Dnl) Landscaped Area
		(Dnp) Paved Area (other than parking)
		(Dns) Miscellaneous Structures
		(Dnt) Tent
	(Do) Open Land	
	(Dp) Pile	
	(Dr) Recreational	(Drb) Building
		(Drg) Golf Course
		(Drp) Park
		(Drm) Marina or Boat Dock
		(Drs) Stadium, Fairgrounds, Race Track
	(Ds) Residential	(Dss) Single House
		(Dsm) Subdivision
	(Dt) Transportation	(Dtr) Railroad
		(Dth) Road (major roads and highways)
		(Dtp) Parking Lot
		(Dtt) Trail (unpaved road)
		(Dts) Sidewalk
	(Du) Utility	
Agricultural	(Ab) Building	
	(Ac) Cropland/Pastureland	
	(Ao) Orchard	
Undeveloped	(Ub) Bare Land	
	(Ue) Erosion	
	(Uf) Forest	
	(Ug) Grassland	
	(Us) Scrub/Shrub	
Water	(Wl) Lake/Pond	
	(Wr) Reservoir	
	(Ws) River/Stream	
Wetland	(Lw) Wetland	
Not Identified	(Ni) Not Identified	

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